

Appendix E

Freds Fire Reforestation Project

Economic Analysis

COST AND REVENUE PROJECTIONS BY ALTERNATIVE

Environmental data collection, analysis, and document writing costs have not been included in the economic analysis as these costs would be the same for each alternative and would not assist in the differentiation of alternatives. These costs usually range from \$40.00 to \$100.00 per acre analyzed depending upon the complexity of the analysis. In addition, appeals and litigation costs also have not been included. It is very difficult to predict which projects would get appealed and litigated. For instance, the Plantation Protection Project and the 2004 Vegetation management in Conifer Plantations Environmental Assessments were appealed. However, all the other projects on the Eldorado National Forest since 1991 involving herbicides, both plantation establishment and release projects, and noxious weed projects, have not been appealed or litigated.

Only future costs and benefits are analyzed. Costs already incurred are considered “sunk costs”, and are not used. These sunk costs are associated with past planting or radial grubbing to remove competing vegetation on approximately 1,870 acres. On going procedures such as fire protection or speculative actions such as future timber sale planning and administration, future road construction and logging costs are not included in the analysis.

All treatments would begin in base year 1, and end about year 6, except for invasive plant treatments. For this analysis, available funding to carry out all needed treatments is assumed, as is accomplishment of these treatments.

The estimates for implementation costs for each alternative are detailed in the following tables. All costs are discounted at 4 percent per year to reflect the time value of money. If we choose to invest \$100 in reforestation, we lose the use of that money for a certain period of time. At a 4 percent discount rate, the annual cost to society of a \$100 investment is \$4. This is equivalent to the "real" rate of interest or the interest rate after subtracting the effects of inflation. By discounting all future costs and revenues at 4 percent, they can be compared on an equivalent value basis, what those dollars would be worth in terms of today's dollars (present value).

Calculations:

All benefits and costs are discounted to 2009 dollars. The net present value is the present value of future cash flows is calculated using the standard formula:

$$\text{Present Value} = \text{Future Value} / (1.0 + i)^n$$

where the Discount Rate is: $(1.0 + i)^n$

and i = interest rate, and n = time in years

All future costs in this analysis are based on current values. Although these values are expected to change in the future, no attempt is made to predict these changes. However, when discounted to the present, these values provide a simple means to assess the relative economic value of one alternative against another.

Table E-1 displays the treatment cost, discounted cost per acre by year, and net present value for Alternatives 1 and 3. Table E-2 displays the number of person days and person years that would be employed for the Alternatives 1 and 3. There would be no monetary cost or employment associated with the no action alternative (Alternative 2).

DEFINITIONS

Direct Economic Impact: Effects caused directly by primary industry or contractors consuming goods and services at secondary or supporting industries such as hotels, restaurants, parts and equipment, supply, and retail stores and paying wages to its employees.

Indirect Economic Impact: Effects that occur when secondary or supporting industries consume goods and services at other secondary or supporting industries and paying wages to its employees.

Induced Economic Impact: Effects that occur when wages paid to employees (direct and indirect) consume goods and services.

Present Net Value: The present value of future cash flows, which includes only the benefits and costs of producing primary outputs, excluding secondary benefits.

Real Discount Rate: A discount rate adjusted to exclude the effects of inflation. The Forest Service basic discount rate used to evaluate long-term investments and operations in land and resource management is a real rate of 4 percent that does not include an inflation factor.

Table E-1

Treatment Costs and Discounted Treatment Costs

Freds Fire Reforestation Project FEIS

ALTERNATIVE 1				YEAR 1			YEAR 2			YEAR 3			YEAR 4			YEAR 5			YEAR 6		
ACTIVITY	METHOD	COST per ACRE	ACRES	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost
Plant	Hand	\$275	1322							949	\$260,975	\$232,006	373	\$102,575	\$87,682						
Replant/interplant	Hand	\$180	665	148	\$26,640	\$25,615				515	\$92,700	\$82,410									
Site Prep	Herbicide	\$280	1322				949	\$265,720	\$287,403	373	\$104,440	\$92,847									
	Hand Cut	\$500	300	300	\$150,000	\$144,231															
Initial Release	Herbicide	\$280	1868	878	\$245,840	\$236,385	990	\$277,200	\$299,820												
	Hand	\$450	35	35	\$15,750	\$15,144															
Follow-up Release	Herbicide	\$280	3190				98	\$27,440	\$29,679	780	\$218,400	\$194,157	1939	\$542,920	\$464,090	373	\$104,440	\$85,842			
	Hand	\$450	35							35	\$15,750	\$14,002							35	\$15,750	\$11,969
Mastication	Mechanical	\$500	338													338	\$169,000	\$138,906			
Invasive Plants	Herbicide	\$275	72	72	\$19,800	\$19,038	35	\$9,625	\$10,410	35	\$9,625	\$8,557	25	\$6,875	\$5,877	25	\$6,875	\$5,651	25	\$6,875	\$5,224
Subtotal						\$440,413			\$627,312			\$623,978			\$557,649			\$243,344			\$17,193
TOTAL COST																					

ALTERNATIVE 1				YEAR 7			YEAR 8			YEAR 9			YEAR 10		
ACTIVITY	METHOD	COST per ACRE	ACRES	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost
Plant	Hand	\$275	1322												
Replant/interplant	Hand	\$180	665												
Site Prep	Herbicide	\$280	1322												
	Hand Cut	\$500	300												
Initial Release	Herbicide	\$280	1868												
	Hand	\$450	35												
Follow-up Release	Herbicide	\$280	3190												
	Hand	\$450	35												
Mastication	Mechanical	\$500	338												
Invasive Plants	Herbicide	\$275	72	25	\$6,875	\$6,611	25	\$6,875	\$7,436	25	\$6,875	\$6,112	25	\$6,875	\$5,877
Subtotal						\$6,611			\$7,436			\$6,112			\$5,877
TOTAL COST															\$2,530,047
										Cost per Acre	\$2,530,047 /3,319 acres =				\$762

Table E-2

Treatment Cost and Discounted Treatment Cost

Freds Fire Reforestation Project FEIS

ALTERNATIVE 3				YEAR 1			YEAR 2			YEAR 3			YEAR 4			YEAR 5		
ACTIVITY	METHOD	COST per ACRE	ACRES	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost
Plant	Hand	\$275	592							592	\$162,800	\$144,729						
Replant/interplant	Hand	\$180	665	148	\$26,640	\$25,615				515	\$92,700	\$82,410						
Release	Hand	\$450	2460	900	\$405,000	\$389,423	1891	\$850,950	\$920,388	2588	\$1,164,600	\$1,035,325	2588	\$1,164,600	\$995,505	1653	\$743,850	\$611,390
Mastication	Mechanical	\$500	338													338	\$169,000	\$138,906
Invasive Plants	Hand	\$500	72	72	\$36,000	\$34,615	72	\$36,000	\$38,938	72	\$36,000	\$32,004	36	\$18,000	\$15,386	36	\$18,000	\$14,795
Subtotal						\$449,654			\$959,325			\$1,294,468			\$1,010,891			\$765,091

ALTERNATIVE 3 -Continued				YEAR 6			YEAR 7			YEAR 8			YEAR 9			Year 10		
ACTIVITY	METHOD	COST per ACRE	ACRES	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost	Acre	Cost	Discounted Cost
Plant	Hand	\$275	592															
Replant/interplant	Hand	\$180	665															
Release	Hand	\$450	2460	402	\$180,900	\$142,968												
Mastication	Mechanical	\$500	338															
Invasive Plants	Hand	\$500	72	36	\$18,000	\$14,226	36	\$18,000	\$13,679	36	\$18,000	\$13,152	36	\$18,000	\$12,647	36	\$18,000	\$12,160
Subtotal						\$157,194			\$13,679			\$13,152			\$12,647			\$12,160
TOTAL COST																		\$4,688,260
															Cost per Acre \$4,688,260 /2,519 acres =			\$1,906

Table E-3

Employment (person days) by Alternative

Freds Fire Reforestation Project FEIS

Alternative 1		Acres	Treatment Acres by Year										SUM (Acres)	Crew size	Production (Acres/day)	Total Days	Crew Person Days	Contract Admin Crew Size	Admin Person Days
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10							
Plant	Hand	1322			949	373							1322	10	25	53	529	3	159
Replant/interplant	Hand	1000	148		515								663	10	25	27	265	3	80
Site Prep	Herbicide	1322			373								373	15	30	12	187	4	50
	Hand	559	300																
Initial Release																			
	Herbicide	1868	878	990									1868	15	25	75	1121	4	299
	Hand	35	35										35	15	15	2	35	1	2
Follow-up Release																			
	Herbicide	3190		98	780	1939	373						3190	15	35	91	1367	4	365
	Hand	35			35		35	35					105	15	15	7	105	1	7
Mastication																			
	Mechanical	338					338						338	1	3	113	113	1	113
Invasive Plants																			
	Herbicide	72	72	35	35	25	25	25					217	2	4	54	109		0
TOTAL			1433	1,123	2,687	2,337	771	60									3830		1073
																	Total Person Days		4903

Alternative 3		Acres	Treatment Acres by Year										SUM (Acres)	Crew size	Production (Acres/day)	Total Days	Crew Person Days	Contract Admin Crew Size	Admin Person Days
			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10							
Plant	Hand	592			592								592	10	25	24	237	3	71
Replant/interplant	Hand	1000	148		515								663	10	25	27	265	3	80
Release	Hand	2460	900	1891	2588	2588	1653	402					10022	15	15	668	10022	1	668
Mastication																			
	Mechanical	338					338						338	1	3	113	113	1	113
Invasive Plants																			
	Hand	72	72	72	72	72	36	36	36	36	36	36	504	2	0.25	2016	4032		0
TOTAL			1120	1963	3767	2660	2027	438	36	36	36	36					14669		931
																	Total Person Days		15600

Example - Plant 1322 acres/ 25 acres per day = 53 total days. 53 days x 10 person crew = 529 crew person days. 53 total days X Contract Admin Crew of 3 = 159 Admin Crew Person Days